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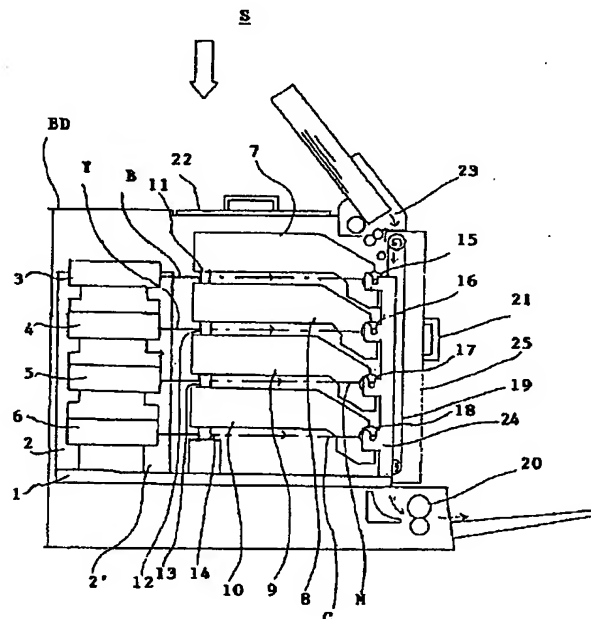
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(54) 【発明の名称】 電子写真装置

(57) 【要約】

【課題】 カラー印刷が可能な電子写真装置において、その整備性を向上させると共に、鮮明な印刷画像が得られる電子写真装置を提供する。

【解決手段】 各印刷色に対応するとともに夫々に感光体15乃至18を備えたカートリッジ7乃至10を上下方向に並ぶように配列する。そして、転写紙を送って夫々の感光体15乃至18に接触させ、各印刷色の転写を行うための転写ベルト19を前蓋25内に配置し、前蓋25の開閉動作に伴って前蓋25と共に開閉可能とする。また、各カートリッジ7乃至10を夫々カートリッジ支持部11乃至14で相互に間隔を開けて支持し、各印刷色に対応する光ビームB、Y、M及びCがスキャナ3乃至6から出射され、対応する感光体15乃至18に直接照射されるように当該光ビームB、Y、M及びCの光路を確保する。更に、スキャナ支持具2及び2'とカートリッジ支持具24を同じ線膨張係数を有する材料により形成する。



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【特許請求の範囲】

【請求項 1】 いずれかの印刷色に対応する一の感光体を夫々に含む複数の現像手段と、夫々の前記感光体が上下に並ぶように前記複数の現像手段を支持する支持部材と、を内部に含む本体フレームと、上下方向に転写紙を送りつつ、夫々の前記感光体の感光面に当該転写紙を順次接触させることにより各印刷色に対応する転写を行う転写手段を内側に備え、回動しつつ開閉可能な扉部と、を備えたことと特徴とする電子写真装置。

【請求項 2】 請求項 1 に記載の電子写真装置において、前記支持部材は、前記感光面が鉛直方向の同一平面上に配列されるように前記複数の現像手段を支持すると共に、前記扉部は、鉛直方向に平行な開閉軸を中心として回動しつつ開閉可能とされていることを特徴とする電子写真装置。

【請求項 3】 請求項 1 又は 2 に記載の電子写真装置であって、前記本体フレームは、その内部に、外部から入力された夫々の印刷色に対応する情報に基づいて変調された光ビームを前記感光面に向けて夫々出射する複数の出射手段を更に備え、夫々の前記光ビームが前記出射手段から対応する前記感光体に夫々直接照射されるように前記現像手段が配置されていることを特徴とする電子写真装置。

【請求項 4】 請求項 3 に記載の電子写真装置において、前記支持部材は、夫々の前記感光面が鉛直方向の同一平面上に配列されるように前記感光体を支持し、且つ、上下方向に前記現像手段を出入可能に支持する感光体支持部材と、前記光ビームの光路を遮断しないように夫々の前記現像手段を支持するために夫々の前記現像手段に設けられた現像手段支持部材と、からなることを特徴とする電子写真装置。

【請求項 5】 請求項 4 に記載の電子写真装置において、前記複数の出射手段を上下に積層して支持する出射手段支持部材と前記感光体支持部材とが同一の線膨張係数を有する材料により形成されてなることを特徴とする電子写真装置。

【請求項 6】 請求項 1 から 5 のいずれか一項に記載の電子写真装置において、前記複数の現像手段は、夫々の印刷色の使用頻度の順に、使用頻度の最も高い印刷色に対応する前記現像手段が最上部となるように支持されていることを特徴とする電子写真装置。

【請求項 7】 請求項 6 に記載の電子写真装置において、

使用頻度の最も高い印刷色に対応する前記現像手段は、ブラックの印刷色に対応する前記現像手段であることを特徴とする電子写真装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、コンピュータ等から入力された情報に基づき、二種類又はそれ以上の種類の印刷色により、いわゆるカラー印刷を行うための電子写真装置に関する。

【0002】

【従来の技術】従来、カラー印刷を行うプリンタ等の電子写真装置においては、外部のコンピュータ等から送られてくる情報を、ブラック、イエロー、マゼンタ及びシアン各印刷色に分離し、当該分離した各印刷色毎の情報に基づいて夫々の色毎に個別の光ビームを変調し、対応する夫々の色毎にドラム式の感光体に照射して当該感光体上に夫々の色毎の情報に対応する画像等を記録していた。そして、画像等が記録された感光体に対して、予め当該感光体と逆極性となるように帯電された対応する各印刷色のトナーを付着させ、当該各印刷色のトナーが付着した感光体の感光面に順次転写紙を接触させることにより印刷色毎に転写を行い、最終的にそれらの印刷色が重なったカラー画像として出力していた。

【0003】ここで、上記の構成を有する従来の電子写真装置においては、各感光体及びトナーを含むカートリッジ等の現像部が感光体を下にして水平方向に並列に並ぶように配置され、当該感光体に対して、所定の反射ミラー等の偏向装置により向きを変えることにより上記各印刷色毎の光ビームが照射されて画像が記録される構成が一般的であった。

【0004】また、転写紙は、転写ベルト上を送られることにより、順次各感光体の感光面に接触させられるが、このとき、当該転写ベルトは、各現像部の下部を水平方向に転写紙を送ることにより転写を行うこととなる。

【0005】一方、上記従来の電子写真装置においては、トナーの補充等の整備を行う場合には、各現像部を水平方向に引出すことにより当該整備を行っていた。

【0006】

【発明が解決しようとする課題】しかしながら、上記従来技術の電子写真装置においては、各現像部の下部に転写ベルトが配置されているので、紙詰り等が生じた場合に、それを取り除くためには、その上部にある現像部全体を開閉することが必要であるが、一般に複数の現像部を含む部分は非常に重くなり、開閉の際の利便性が低く、整備性が悪いという問題点があった。

【0007】また、上記従来技術の電子写真装置においては、光ビームが照射されるべき感光体が現像部の下部

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にあるので、光ビームの光路を複雑に変更して感光体に照射する必要があり、そのための反射ミラー等が必要となると共に、電子写真装置全体の構成が複雑になるという問題点があった。

【0008】更に、光路変更を行うための反射ミラー等の位置が定着器等の高熱を発する部材による熱のために変形し、感光体上の光ビームの照射位置が変動し、各印刷色毎の感光体上の画像記録位置が変動するために、それらを重ねたカラー印刷において色ずれ等が生じ、鮮明度が低下するという問題点もあった。

【0009】更にまた、現像部の整備の際には水平方向に引出す構造であったために、電子写真装置の設置場所以外に整備のための空間が必要となり、電子写真装置配置のための自由度が低下するという問題点があった。

【0010】そこで、本発明は、上記の各問題点に鑑みて成されたもので、その課題は、カラー印刷が可能な電子写真装置において、その整備性を向上させると共に、鮮明な印刷画像が得られる電子写真装置を提供することにある。

【0011】

【課題を解決するための手段】上記の課題を解決するために、請求項 1 に記載の発明は、ブラック、マゼンタ、イエロー及びシアンの印刷色のうち、いずれかの印刷色に対応する一の感光体を夫々に含む複数のカートリッジ等の現像手段と、夫々の前記感光体が上下に並ぶように前記複数の現像手段を支持する支持部材と、を内部に含む本体フレームと、上下方向に転写紙を送りつつ、夫々の前記感光体の感光面に当該転写紙を順次接触させることにより各印刷色に対応する転写を行う転写ベルト等の転写手段を内側に備え、回動しつつ開閉可能な前蓋等の扉部と、を備えて構成される。

【0012】請求項 1 に記載の発明の作用によれば、本体フレームには、いずれかの印刷色に対応する一の感光体を夫々に含む複数の現像手段が、支持部材により夫々に含まれる感光体が上下に並ぶように支持されて備えられている。

【0013】そして、回動しつつ開閉可能とされた扉部の内側には、上下方向に転写紙を送りつつ、夫々の感光面に当該転写紙を順次接触させることにより各印刷色に対応する転写を行う転写手段が備えられている。

【0014】よって、各印刷色の転写中において転写紙の紙詰りが生じた場合でも、転写手段を備えた扉部が回動しつつ開閉可能とされているので、転写紙が通過する通過経路を使用者に対して露出させることができ、紙詰り除去処理を簡便に行うことができる。

【0015】上記の課題を解決するために、請求項 2 に記載の発明は、請求項 1 に記載の電子写真装置において、前記支持部材は、前記感光面が鉛直方向の同一平面上に配列されるように前記複数の現像手段を支持すると共に、前記扉部は、鉛直方向に平行な開閉軸を中心とし

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て回動しつつ開閉可能とされて構成される。

【0016】請求項 2 に記載の発明の作用によれば、請求項 1 に記載の発明の作用に加えて、支持部材は、感光面が鉛直方向の同一平面上に配列されるように複数の現像手段を支持すると共に、扉部は、鉛直方向に平行な開閉軸を中心として回動しつつ開閉可能とされているので、各印刷色の転写中において転写紙の紙詰りが生じた場合でも、転写手段を備えた扉部が鉛直方向に平行な開閉軸を中心として回動しつつ開閉可能とされているので、転写紙が通過する通過経路を使用者に対して露出させることができ、紙詰り除去処理を簡便に行うことができる。

【0017】上記の課題を解決するために、請求項 3 に記載の発明は、請求項 1 又は 2 に記載の電子写真装置であって、前記本体フレームは、その内部に、外部から入力された夫々の印刷色に対応する情報に基づいて変調された光ビームを前記感光面に向けて夫々出射する複数のスキャナ等の出射手段を更に備え、夫々の前記光ビームが前記出射手段から対応する前記感光体に夫々直接照射されるように前記現像手段が配置されて構成される。

【0018】請求項 3 に記載の発明の作用によれば、請求項 1 又は 2 に記載の発明の作用に加えて、本体フレームに含まれる複数の出射手段は、外部から入力された情報に基づいて変調された光ビームを感光体の感光面に向けて夫々出射する。

【0019】このとき、現像手段は、夫々の光ビームが出射手段から対応する感光体に夫々直接照射されるように配置されている。よって、感光体までの光ビームの光路上に光ビームの反射ミラー等の偏向手段が必要ないので、電子写真装置の構成を簡略化することができる。

【0020】上記の課題を解決するために、請求項 4 に記載の発明は、請求項 3 に記載の電子写真装置において、前記支持部材は、夫々の前記感光面が鉛直方向の同一平面上に配列されるように前記感光体を支持し、且つ、上下方向に前記現像手段を出入可能に支持する感光体支持部材と、前記光ビームの光路を遮断しないように夫々の前記現像手段を支持するために夫々の前記現像手段に設けられたカートリッジ紙支持部等の現像手段支持部材と、からなるように構成される。

【0021】請求項 4 に記載の発明の作用によれば、請求項 3 に記載の発明の作用に加えて、感光体支持部材は、夫々の感光面が鉛直方向の同一平面上に配列され、且つ、上下方向に現像手段を出入可能なように感光体を支持する。

【0022】一方、夫々の現像手段に設けられた現像手段支持部材は、光ビームの光路を遮断しないように夫々の現像手段を支持する。よって、感光体を含む現像手段が、夫々の感光面が鉛直方向の同一平面上に配列され、且つ、上下方向に現像手段を出入可能なように支持されるので、現像手段交換時等の整備性が向上する。

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【0023】また、現像手段支持部材が夫々の現像手段を支持するので、感光体までの光ビームの光路を遮断することがない。上記の課題を解決するために、請求項5に記載の発明は、請求項4に記載の電子写真装置において、前記複数の出射手段を上下に積層して支持する出射手段支持部材と前記感光体支持部材とが同一の線膨張係数を有するステンレス鋼等の材料により形成されて構成される。

【0024】請求項5に記載の発明の作用によれば、請求項4に記載の発明の作用に加えて、出射手段支持部材と感光体支持部材とが同一の線膨張係数を有する材料により形成されているので、電子写真装置が加熱されても出射手段と感光体の位置関係が変動しない。よって、光ビームの感光体上の照射位置が変動することがないので、鮮明な転写像が得られる。

【0025】上記の課題を解決するために、請求項6に記載の発明は、請求項1から5のいずれか一項に記載の電子写真装置において、前記複数の現像手段は、夫々の印刷色の使用頻度の順に、使用頻度の最も高い印刷色に対応する前記現像手段が最上部となるように支持されて構成される。

【0026】請求項6に記載の発明の作用によれば、請求項1から5のいずれか一項に記載の発明の作用に加えて、複数の現像手段は、夫々の印刷色の使用頻度の順に、使用頻度の最も高い印刷色に対応する現像手段が最上部となるように支持されているので、現像手段交換時等の整備性が向上する。

【0027】上記の課題を解決するために、請求項7に記載の発明は、請求項6に記載の電子写真装置において、使用頻度の最も高い印刷色に対応する前記現像手段は、ブラックの印刷色に対応する前記現像手段であるように構成される。

【0028】請求項7に記載の発明の作用によれば、請求項6に記載の発明の作用に加えて、使用頻度の最も高い印刷色であるブラックに対応する現像手段が最上部に配置されているので、現像手段交換時等の整備性が向上する。

【0029】

【発明の実施の形態】次に、本発明に好適な実施の形態について図1及び図2を用いて説明する。なお、図1は、本実施形態の電子写真装置Sの内部機構を示す側面図を示し、図2は図1の太矢印方向から見た電子写真装置Sの内部機構を示す上面図を示している。

【0030】図1及び図2に示すように、電子写真装置Sは、ベースプレート1と、出射手段支持部材としてのスキヤナ支持具2及び2'と、出射手段としてのブラックスキヤナ3と、出射手段としてのイエロースキヤナ4と、出射手段としてのマゼンタスキヤナ5と、出射手段としてのシアンスキヤナ6と、現像手段としてのブラックカートリッジ7と、現像手段としてのイエローカート

リッジ8と、現像手段としてのマゼンタカートリッジ9と、現像手段としてのシアンカートリッジ10と、現像手段支持部材としてのカートリッジ支持部11、12、13及び14と、感光体としてのブラック感光体15と、感光体としてのイエロー感光体16と、感光体としてのマゼンタ感光体17と、感光体としてのシアン感光体18と、転送手段としての転送ベルト19と、定着器20と、上蓋22と、給紙カセット23と、感光体支持部材としての感光体支持具24と、把手21を有する扉部としての前蓋25と、開閉軸27と、本体フレームBDとにより構成されている。ここで、各カートリッジ7乃至10は、それぞれその上面にカートリッジ把手26を有している。また、ブラックスキヤナ3はブラック光ビームBを出射し、イエロースキヤナ4はイエロー光ビームYを出射し、マゼンタスキヤナ5はマゼンタ光ビームMを出射し、シアンスキヤナ6はシアン光ビームCを出射する。

【0031】次に、詳細な構成及び夫々の動作を説明する。カラー印刷して出力すべき情報は、図示しないコンピュータ等において各印刷色毎の情報に分離され、夫々の印刷色の情報毎にブラックスキヤナ3、イエロースキヤナ4、マゼンタスキヤナ5及びシアンスキヤナ6に入力される。そして、各スキヤナ3乃至6に含まれる図示しない半導体レーザから出力された夫々の光ビームB、Y、M及びCが、各スキヤナ3乃至6に含まれる図示しないポリゴンミラー等により夫々に入力された上記情報に基づいて図1の紙面に垂直な方向（図2において両矢印で示す方向）に偏向走査される。

【0032】このとき、各スキヤナ3乃至6はベースプレート1上に固定されたスキヤナ支持具2及び2'により、互いに積層されて本体フレームBDに固定され保持されている。

【0033】一方、各印刷色に対応するブラックカートリッジ7、イエローカートリッジ8、マゼンタカートリッジ9及びシアンカートリッジ10には、それぞれにドラム状（円筒状）のブラック感光体15、イエロー感光体16、マゼンタ感光体17及びシアン感光体18が備えられており、上記の各スキヤナ3乃至6からの偏向走査された各光ビームB、Y、M及びCが各感光体15乃至18に照射されると共に、各感光体15乃至18が図1の紙面に垂直な軸を中心として図1中右回りに回転することにより、当該各感光体15乃至18上に各印刷色の情報に対応する画像が記録される。そして、夫々の画像が記録された部分に、各カートリッジ7乃至10内に蓄えられ、予め各感光体15乃至18とは逆極性に帯電された夫々の印刷色のトナーが付着する。このとき、各感光体15乃至18は、夫々の回転軸が感光体支持具24に保持されることにより、夫々の感光面が鉛直方向に略平行な同一平面内に存在するように保持される。この感光体支持具24は、上記スキヤナ支持具2及び2'と

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同じ線膨張係数を有する材料により形成され、ベースプレート1を介して本体フレームBDに固定されている。この場合、感光体支持具24並びにスキャナ支持具2及び2'の材料としては、ステンレス鋼又は亜鉛メッキ鋼等のうち、いずれかが用いられる。

【0034】更に、各カートリッジ7乃至10の感光体15乃至18を有する端部と反対側の端部は、夫々略円筒形のカートリッジ支持部11、12、13及び14により隣接するカートリッジと所定の距離を隔てて支持されている。このとき、カートリッジ支持部11はブラックカートリッジ7に固定され、カートリッジ支持部12はイエローカートリッジ8に固定され、カートリッジ支持部13はマゼンタカートリッジ9に固定され、カートリッジ支持部14はシアンカートリッジ10に固定されている。また、各カートリッジ支持部11乃至14は、図2に示すように、夫々の光ビームB、Y、M及びCの走査範囲外に設けられている。これにより、各光ビームB、Y、M及びCが直接対応する感光体15乃至18に照射されるための光路が確保されることとなる。

【0035】そして、図1に示すように、各感光体15乃至18を含む各カートリッジ7乃至10が電子写真装置Sの上方から挿入可能なように感光体支持部24により支持されているので、各カートリッジ7乃至10におけるトナーの補充等の整備のときには、各カートリッジ7乃至10を電子写真装置Sの上方に引出すことにより行うことができる。更に、最もトナーの使用頻度が高い（換言すれば、最も交換頻度の高い）ブラックカートリッジ7を最上部として、以下、使用頻度の高い順にイエローカートリッジ8、マゼンタカートリッジ9及びシアンカートリッジ10が積層されて支持されていることにより更に整備が容易になることとなる。

【0036】また、給紙カセット23から給紙される転写紙は、転送ベルト19上を図1中上から下に移送され、その移送途中において、画像が記録された部分に各印刷色のトナーが付着し回転している感光体15乃至18に接触することにより、各印刷色毎の画像の転写が行われ、四つの印刷色において当該転写が行われることにより最終的にカラー印刷された転写紙となり、定着器20において各印刷色のトナーが定着されて出力される。なお、図1には、転写紙の経路を矢印で示している。ここで、転写ベルト19は前蓋25の内側に備え付けられており、図2に点線で示すように、把手21を引くことによる開閉軸27を中心とした前蓋25の開閉に伴って開閉し、前蓋25を開けた状態では、感光体15乃至18を含む転写紙の通過経路全体が露出するようになっている。このとき、転写ベルト19に対する転写紙転送のための回転動力の伝達は、前蓋25及び本体フレームBDに備えられた図示しない歯車間の連動による。

【0037】更に、図2に示すように、各カートリッジ7乃至10には夫々上部にカートリッジ把手26が備え

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られており、トナーの交換整備等の際に簡単に上方に引出せるようになっている。

【0038】以上説明したように、本実施形態によれば、転写紙が、本体フレームBD内に積層された感光体15乃至18の各感光面に順次接するように転写ベルト19により送られると共に、当該転写ベルト19が前蓋25の内側に備えられ、当該前蓋25が転写ベルト19と共に本体フレームBDに対して開閉可能とされているので、各印刷色の転写中において転写紙の紙詰りが生じた場合でも、転写紙が通過する通過経路全体を使用者に対して露出させることができ、紙詰り除去処理を簡便に行うことができる。

【0039】また、各カートリッジ7乃至10が夫々の光ビームB、Y、M及びCが各スキャナ3乃至6から対応する感光体15乃至18に夫々直接照射されるように配置されているので、感光体15乃至18までの光ビームB、Y、M及びCの光路上に反射ミラー等の偏向装置が必要なく、電子写真装置の構成を簡略化することができる。

【0040】更にまた、感光体支持部24が、夫々の感光面が鉛直方向の同一平面上に配列され、且つ、鉛直方向に各カートリッジ7乃至10を出し入れ可能なように感光体15乃至18を支持するので、カートリッジ交換時等の整備性が向上する。

【0041】また、カートリッジ支持部11乃至14が、光ビームB、Y、M及びCの光路を遮断しないように夫々のカートリッジ7乃至10を支持するので、感光体15乃至18までの各光ビームの光路を遮断することがない。

【0042】更にまた、スキャナ支持具2及び2'と感光体支持部24とが同一の線膨張係数を有する材料により形成されているので、電子写真装置が加熱されてもスキャナ3乃至6と感光体15乃至18の対応する位置関係が変動しない。よって、光ビームB、Y、M及びCの感光体15乃至18上の照射位置が変動することがないので、鮮明な転写像が得られる。

【0043】また、各カートリッジ7乃至10が、ブラックカートリッジ7を最上部として夫々の印刷色の使用頻度の順に配置されているので、カートリッジ交換時等の整備性が向上する。

【0044】なお、上記の実施形態では、カラープリンタに対して本発明を適用した場合を示したが、これに限らず、カラーファックスまたはカラーコピー等に対しても本発明は適用可能である。

【0045】

【発明の効果】以上説明したように、請求項1に記載の発明によれば、転写紙が、本体フレーム中に上下に並ぶように配列された各印刷色に対応する現像手段の感光体における感光面に順次接するように転写手段により送られると共に、当該転写手段を内側に備えた扉部が回転し

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つつ開閉可能とされているので、各印刷色の転写中において転写紙の紙詰りが生じた場合でも、転写紙が通過する通過経路を使用者に対して露出させることができ、紙詰り除去処理を簡便に行うことができる。

【0046】従って、電子走査装置における整備性を向上させることができる。請求項2に記載の発明によれば、請求項1に記載の発明の効果に加えて、支持部材が感光体の感光面が鉛直方向の同一平面上に配列されるように複数の現像手段を支持すると共に、扉部が鉛直方向に平行な開閉軸を中心として回転しつつ開閉可能とされているので、各印刷色の転写中において転写紙の紙詰りが生じた場合でも、転写紙が通過する通過経路を使用者に対して露出させることができ、紙詰り除去処理を簡便に行うことができる。

【0047】請求項3に記載の発明によれば、請求項1又は2に記載の発明の効果に加えて、現像手段が夫々の光ビームが出射手段から対応する感光体に夫々直接照射されるように配置されているので、感光体までの光ビームの光路上に光ビームの反射ミラー等の偏向手段が必要なく、電子写真装置の構成を簡略化することができる。

【0048】請求項4に記載の発明によれば、請求項3に記載の発明の効果に加えて、感光体支持部材が、夫々の感光面が鉛直方向の同一平面上に配列され、且つ、上下方向に現像手段を出入可能なように感光体を支持するので、現像手段交換時等の整備性が向上する。

【0049】また、現像手段支持部材が、光ビームの光路を遮断しないように夫々の現像手段を支持するので、感光体までの光ビームの光路を遮断することがなく、感光体までの光ビームの光路上に光ビームの反射ミラー等の偏向手段が必要ないこととなり、電子写真装置の構成を簡略化することができる。

【0050】請求項5に記載の発明によれば、請求項4に記載の発明の効果に加えて、出射手段支持部材と感光体支持部材とが同一の線膨張係数を有する材料により形成されているので、電子写真装置が加熱されても出射手段と感光体の位置関係が変動しない。

【0051】従って、光ビームの感光体上の照射位置が変動することがないので、鮮明な転写像が得られる。請求項6に記載の発明によれば、請求項1から5のいずれか一項に記載の発明の効果に加えて、複数の現像手段が、夫々の印刷色の使用頻度の順に、使用頻度の最も高い印刷色に対応する現像手段が最上部となるように配置

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されているので、現像手段交換時等の整備性が向上する。

【0052】請求項7に記載の発明によれば、請求項6に記載の発明の効果に加えて、使用頻度の最も高い印刷色であるブラックに対応する現像手段が最上部に配置されているので、現像手段交換時等の整備性が向上する。

【図面の簡単な説明】

【図1】実施形態の電子写真装置の内部機構を示す側面図である。

【図2】図1の太矢印方向から見た電子写真装置の内部機構を示す上面図を示している。

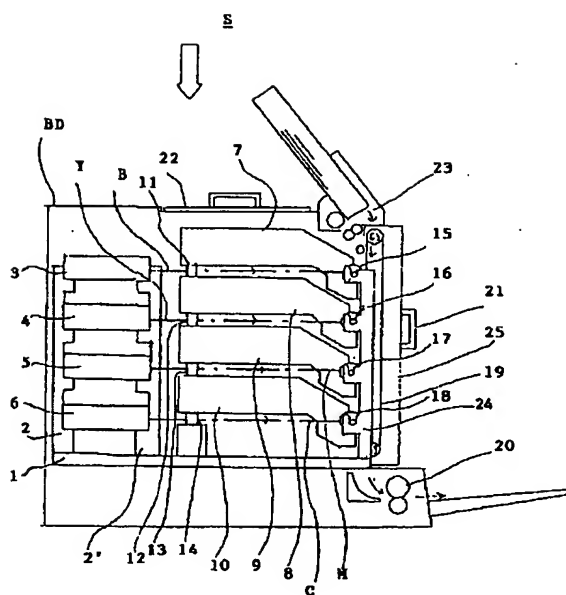
【符号の説明】

- 1…ベースプレート
- 2、2'…スキヤナ支持具
- 3…ブラックスキヤナ
- 4…イエロースキヤナ
- 5…マゼンタスキヤナ
- 6…シアンスキヤナ
- 7…ブラックカートリッジ
- 8…イエローカートリッジ
- 9…マゼンタカートリッジ
- 10…シアンカートリッジ
- 11、12、13、14…カートリッジ支持部
- 15…ブラック感光体
- 16…イエロー感光体
- 17…マゼンタ感光体
- 18…シアン感光体
- 19…転送ベルト
- 20…定着器
- 21…把手
- 22…上蓋
- 23…給紙カセット
- 24…感光体支持具
- 25…前蓋
- 26…カートリッジ把手
- 27…開閉軸
- BD…本体フレーム
- B…ブラック光ビーム
- Y…イエロー光ビーム
- M…マゼンタ光ビーム
- C…シアン光ビーム

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【図 1】



【図 2】

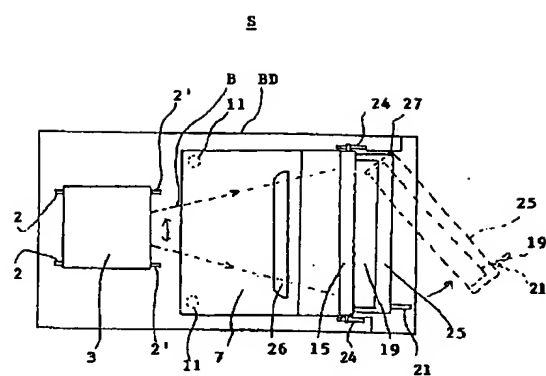


Image forming apparatus having a plurality of vertically stacked image forming units

Patent Number: ☐ US5787324
Publication date: 1998-07-28
Inventor(s): IWASAKI TAKEO (JP)
Applicant(s): BROTHER IND LTD (JP)
Requested Patent: ☐ JP9141972
Application Number: US19960718864 19960924
Priority Number(s): JP19950300314 19951117
IPC Classification: G03G21/00
EC Classification: G03G15/01S2
Equivalents:

Abstract

Maintenance performance is promoted and a vivid printed image is provided in an electrophotographic device capable of conducting color printing. Cartridges corresponding to different printing colors, each of which includes a photosensitive body, are stacked in a vertical direction. A recording sheet is fed along a sheet feeding path and brought into contact with the photosensitive bodies corresponding to the respective colors, and toner images of the respective printing colors are transferred on the recording sheet. A transfer belt for feeding the recording sheet is arranged in a front cover, and the transfer belt is exposed when the front cover is opened. Therefore, correcting a mis-feeding of the recording sheet is facilitated. Also, the respective cartridges are spaced apart such that optical paths are provided between the cartridges so that optical beams corresponding to the respective printing colors may be directly irradiated onto the corresponding photosensitive bodies. In addition, the cartridges and optical scanners are mounted on the device using materials having substantially the same coefficient of thermal expansion so that changes in the ambient temperature will not affect the relative positions of the scanners and the photosensitive bodies.

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Basket	Patent Number	Title
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<input type="checkbox"/>	JP9141972	ELECTROPHOTOGRAPHIC SYSTEM

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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : BROTHER IND LTD

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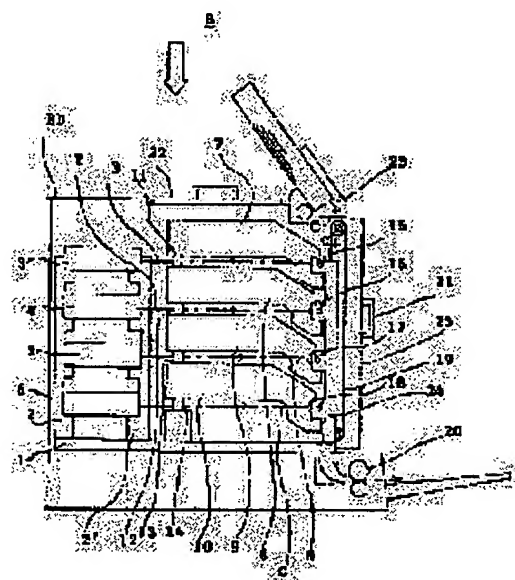
(72)Inventor : IWASAKI TAKAO

(54) ELECTROPHOTOGRAPHIC SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a color electrophotographic system in which a clear print image can be obtained while enhancing the maintainability.

SOLUTION: Cartridges 7,..., 10 corresponding to respective printing colors and provided with photosensitive members 15,..., 18 are arranged vertically and then a transfer paper is fed and brought into contact with the photosensitive members 15,..., 18. A transfer belt 19 for each print color is disposed in a front cover 25 so that it can be opened or closed together with the front cover 25. The cartridges 7,... 10 are supported by cartridge supporting parts 11,..., 14 while spaced apart from each other. Light beams B, Y, M and C corresponding to respective print color are projected from scanners 3,..., 6 and the optical paths are ensured for the light beams B, Y, M, C such that the corresponding photosensitive members 15,..., 18 are irradiated directly. Scanner supports 2, 2' and a cartridge support 24 are made of materials having identical coefficient of linear expansion.



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CLAIMS

[Claim(s)]

[Claim 1] Electrophotography equipment by which it is characterized for it to be characterized by providing the following Two or more development means which contain a photo conductor of 1 corresponding to one of printing colors in each Supporter material which supports said two or more development means so that said each photo conductor may be located in a line up and down A main part frame included inside It is the door which can be opened and closed, having an imprint means to carry out an imprint corresponding to each printing color to a sensitization side of each of said photo conductor by carrying out sequential contact of the transfer paper concerned, sending a transfer paper in the vertical direction inside, and rotating.

[Claim 2] Said supporter material is electrophotography equipment characterized by making closing motion possible, said door rotating a closing motion shaft parallel to the direction of a vertical as a center while supporting said two or more development means so that said sensitization side may be arranged on the same flat surface of the direction of a vertical in electrophotography equipment according to claim 1.

[Claim 3] It is electrophotography equipment according to claim 1 or 2. Said main part frame It has further two or more outgoing radiation means which turn to said sensitization side a light beam modulated by the interior based on information corresponding to each printing color inputted from the outside, and carry out outgoing radiation, respectively. Electrophotography equipment characterized by arranging said development means so that said photo conductor with which said each light beam corresponds from said outgoing radiation means may glare directly, respectively.

[Claim 4] Electrophotography equipment according to claim 3 characterized by providing the following Said supporter material is photo conductor supporter material which supports said photo conductor and supports said development means possible [in-and-out] in the vertical direction so that said each sensitization side may be arranged on the same flat surface of the direction of a vertical. Development means supporter material prepared in said each development means in order to support said each development means so that an optical path of said light beam may not be intercepted

[Claim 5] Electrophotography equipment characterized by coming to be formed with a material with which outgoing radiation means supporter material which carries out the laminating of said two or more outgoing radiation means up and down, and supports them in electrophotography equipment according to claim 4, and said photo conductor supporter material have the same coefficient of linear expansion.

[Claim 6] For said development means on electrophotography equipment given in any 1 term of claims 1-5, and corresponding to highest printing color of operating frequency to order of operating frequency of each printing color, said two or more development means are electrophotography equipment characterized by being supported so that it may become the topmost part.

[Claim 7] It is electrophotography equipment characterized by said development means corresponding to highest printing color of operating frequency being said development means corresponding to a printing color of black in electrophotography equipment according to claim 6.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the electrophotography equipment for performing the so-called color printing in the printing color of two kinds or the class beyond it based on the information inputted from the computer etc.

[0002]

[Description of the Prior Art] In electrophotography equipments, such as a printer which performs color printing conventionally The information sent from an external computer etc. Black, yellow, It separated into a Magenta and each printing color of cyanogen, and based on the separated information concerned for every printing color, for each color of every, the light beam according to individual was modulated, the drum-type photo conductor was irradiated for each corresponding color of every, and the image corresponding to the information for each color of every etc. was recorded on the photo conductor concerned. And by contacting a transfer paper to the sensitization side of the photo conductor to which the corresponding toner of each printing color charged so that it might become the photo conductor concerned and reversed polarity beforehand was made to adhere to the photo conductor with which the image etc. was recorded, and the toner of each printing color concerned adhered one by one, it imprinted for every printing color and was outputting as a color picture with which those printing colors lapped eventually.

[0003] The configuration on which it is arranged so that the development sections, such as a cartridge containing each photo conductor and a toner, may turn a photo conductor down and may be horizontally located in a line with juxtaposition, and the light beam for every above-mentioned printing color is irradiated by changing the sense with deflection equipments, such as a predetermined reflective mirror, to the photo conductor concerned, and an image is recorded here in the conventional electrophotography equipment which has the above-mentioned configuration is common.

[0004] Moreover, although a transfer paper is contacted to the sensitization side of each photo conductor one by one by sending an imprint belt top, at this time, the imprint belt concerned will imprint the lower part of each development section by sending a transfer paper horizontally.

[0005] On the other hand, when a supplement of a toner etc. was fixed in the above-mentioned conventional electrophotography equipment, the maintenance concerned was performed by pulling out each development section horizontally.

[0006]

[Problem(s) to be Solved by the Invention] However, although it was required in the electrophotography equipment of the above-mentioned conventional technology to open and close the whole development section in the upper part in order to remove it when a paper jam etc. arose since the imprint belt had been arranged at the lower part of each development section, the portion which generally contains two or more development sections became very heavy, and its convenience in the case of closing motion was low, and it had the trouble that maintainability was bad.

[0007] Moreover, in the electrophotography equipment of the above-mentioned conventional technology, since the photo conductor with which a light beam should be irradiated was in the lower part of the development section, while changing the optical path of a light beam intricately, irradiating the photo conductor and the reflective mirror for it etc. being needed, there was a trouble that the configuration of the whole electrophotography equipment became complicated.

[0008] Furthermore, since it deformed for the heat by the member to which locations, such as a reflective mirror for making an optical-path change, emit high temperature, such as a fixing assembly, the exposure location of the light beam on a photo conductor was changed and the image recording location on the photo conductor for every printing

color was changed, the color gap etc. arose in color printing which piled them up, and there was also a trouble that visibility fell.

[0009] Furthermore, since it was the structure pulled out horizontally in the case of maintenance of the development section again, the space for maintenance was needed in addition to the installation of electrophotography equipment, and there was a trouble that the flexibility for electrophotography equipment arrangement fell.

[0010] Then, this invention was accomplished in view of each above-mentioned trouble, and in the electrophotography equipment which can be color-printed, the technical problem is to offer the electrophotography equipment with which a clear printing image is obtained while raising the maintainability.

[0011]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, invention according to claim 1 with development means, such as two or more cartridges which boil a photo conductor of 1 corresponding to one of printing colors, respectively, and contain it among black, a Magenta, yellow, and a printing color of cyanogen Supporter material which supports said two or more development means so that said each photo conductor may be located in a line up and down, It has imprint means, such as a main part frame included inside and an imprint belt which carries out an imprint corresponding to each printing color to a sensitization side of each of said photo conductor by carrying out sequential contact of the transfer paper concerned, sending a transfer paper in the vertical direction, inside, and rotating, it has doors, such as a front lid which can be opened and closed, and is constituted.

[0012] According to the operation of invention according to claim 1, it is supported and prepares for a main part frame so that a photo conductor with which two or more development means which contain a photo conductor of 1 corresponding to one of printing colors in each are included in each by supporter material may be located in a line up and down.

[0013] And inside a door whose closing motion was enabled rotating, each sensitization side is equipped with an imprint means to perform an imprint corresponding to each printing color, by carrying out sequential contact of the transfer paper concerned, sending a transfer paper in the vertical direction.

[0014] Therefore, since closing motion is made possible, a door equipped with an imprint means rotating even when a paper jam of a transfer paper arises during an imprint of each printing color, a transit route which a transfer paper passes can be exposed to a user, and paper jam clearance processing can be performed simple.

[0015] In order to solve the above-mentioned technical problem, invention according to claim 2 is constituted for said supporter material in electrophotography equipment according to claim 1, closing motion being used as possible, said sensitization side rotating a closing motion shaft with said door parallel to the direction of a vertical as a center, while supporting said two or more development means so that it may be arranged on the same flat surface of the direction of a vertical.

[0016] According to the operation of invention according to claim 2, to an operation of invention according to claim 1 in addition, supporter material While supporting two or more development means so that a sensitization side may be arranged on the same flat surface of the direction of a vertical, a door Since closing motion is made possible, rotating a closing motion shaft parallel to the direction of a vertical as a center Since closing motion is made possible, rotating a closing motion shaft with a door [equipped with an imprint means] parallel to the direction of a vertical as a center even when a paper jam of a transfer paper arises during an imprint of each printing color A transit route which a transfer paper passes can be exposed to a user, and paper jam clearance processing can be performed simple.

[0017] In order to solve the above-mentioned technical problem, invention according to claim 3 It is electrophotography equipment according to claim 1 or 2. Said main part frame It has further outgoing radiation means, such as two or more scanners which turn to said sensitization side a light beam modulated by the interior based on information corresponding to each printing color inputted from the outside, and carry out outgoing radiation, respectively. Said development means is arranged and constituted so that said photo conductor with which said each light beam corresponds from said outgoing radiation means may glare directly, respectively.

[0018] According to the operation of invention according to claim 3, in addition to an operation of invention according to claim 1 or 2, a light beam modulated based on information inputted from the outside is turned to a sensitization side of a photo conductor, and two or more outgoing radiation means included in a main part frame carry out outgoing radiation, respectively.

[0019] At this time, a development means is arranged so that a photo conductor with which each light beam corresponds from an outgoing radiation means may glare directly, respectively. Therefore, since it is unnecessary in deflection means, such as a reflective mirror of a light beam, on an optical path of a light beam to a photo conductor, a configuration of electrophotography equipment can be simplified.

[0020] In order to solve the above-mentioned technical problem, invention according to claim 4 In electrophotography

equipment according to claim 3 said supporter material Photo conductor supporter material which supports said photo conductor and supports said development means possible [in-and-out] in the vertical direction so that said each sensitization side may be arranged on the same flat surface of the direction of a vertical, development means supporter material, such as a cartridge paper supporter formed in said each development means in order to support said each development means so that an optical path of said light beam may not be intercepted, -- since -- it is constituted so that it may become.

[0021] According to the operation of invention according to claim 4, in addition to an operation of invention according to claim 3, each sensitization side is arranged on the same flat surface of the direction of a vertical, and photo conductor supporter material supports a photo conductor so that a development means can be gone in the vertical direction in and out.

[0022] On the other hand, development means supporter material prepared in each development means supports each development means so that an optical path of a light beam may not be intercepted. Therefore, since it is supported so that each sensitization side may be arranged on the same flat surface of the direction of a vertical and a development means containing a photo conductor can go a development means in the vertical direction in and out, maintainability at the time of development means exchange etc. improves.

[0023] Moreover, since development means supporter material supports each development means, an optical path of a light beam to a photo conductor is not intercepted. In order to solve the above-mentioned technical problem, in electrophotography equipment according to claim 4, invention according to claim 5 is formed with materials, such as stainless steel with which outgoing radiation means supporter material which carries out the laminating of said two or more outgoing radiation means up and down, and supports them, and said photo conductor supporter material have the same coefficient of linear expansion, and is constituted.

[0024] according to an operation of invention according to claim 5 -- an operation of invention according to claim 4 -- in addition, since outgoing radiation means supporter material and photo conductor supporter material are formed with a material which has the same coefficient of linear expansion, even if electrophotography equipment is heated, physical relationship of an outgoing radiation means and a photo conductor is not changed. Therefore, since an exposure location on a photo conductor of a light beam is not changed, a clear imprint image is obtained.

[0025] In order to solve the above-mentioned technical problem, it is supported and said development means on electrophotography equipment given in any 1 term of claims 1-5 and corresponding to [in said two or more development means / invention / according to claim 6] highest printing color of operating frequency to order of operating frequency of each printing color is constituted so that it may become the topmost part.

[0026] According to the operation of invention according to claim 6, since a development means corresponding to [in two or more development means / in addition to an operation of invention given in any 1 term of claims 1-5] highest printing color of operating frequency to order of operating frequency of each printing color is supported so that it may become the topmost part, maintainability at the time of development means exchange etc. improves.

[0027] In order to solve the above-mentioned technical problem, said development means on electrophotography equipment according to claim 6 and corresponding to highest printing color of operating frequency in invention according to claim 7 is constituted so that it may be said development means corresponding to a printing color of black.

[0028] Since a development means corresponding to black which is the highest printing color of operating frequency is arranged [according to the operation of invention according to claim 7] at the topmost part in addition to an operation of invention according to claim 6, maintainability at the time of development means exchange etc. improves.

[0029]

[Embodiment of the Invention] Next, the gestalt of the suitable operation for this invention is explained using drawing 1 and drawing 2 . In addition, drawing 1 shows the side elevation showing the internal device of the electrophotography equipment S of this operation gestalt, and drawing 2 shows the plan showing the internal device of the electrophotography equipment S seen from [of drawing 1] the bold arrow.

[0030] As shown in drawing 1 and drawing 2 , electrophotography equipment S A base plate 1, and the scanner support 2 and 2' as outgoing radiation means supporter material, The black scanner 3 as an outgoing radiation means, and the yellow scanner 4 as an outgoing radiation means, The Magenta scanner 5 as an outgoing radiation means, and the cyanogen scanner 6 as an outgoing radiation means, The black cartridge 7 as a development means, and the yellow cartridge 8 as a development means, The Magenta cartridge 9 as a development means, and the cyanogen cartridge 10 as a development means, The cartridge supporters 11, 12, 13, and 14 as development means supporter material, The black photo conductor 15 as a photo conductor, and the yellow photo conductor 16 as a photo conductor, The Magenta photo conductor 17 as a photo conductor, and the cyanogen photo conductor 18 as a photo conductor, It is constituted by the transfer belt 19 as a transfer means, a fixing assembly 20, a top cover 22, a sheet paper cassette 23, the photo conductor

support 24 as photo conductor supporter material, the front lid 25 as a door which has a handle 21, the closing motion shaft 27, and the main part frame BD. Here, each cartridge 7 thru/or 10 have the cartridge handle 26 on the upper surface, respectively. Moreover, the black scanner 3 carries out outgoing radiation of the black light beam B, the yellow scanner 4 carries out outgoing radiation of the yellow light beam Y, the Magenta scanner 5 carries out outgoing radiation of the Magenta light beam M, and the cyanogen scanner 6 carries out outgoing radiation of cyanogen light beam C.

[0031] Next, a detailed configuration and each actuation are explained. It color-prints, and it separates into the information for every printing color in the computer which is not illustrated, and the information which should be outputted is inputted into the black scanner 3, the yellow scanner 4, the Magenta scanner 5, and the cyanogen scanner 6 for every information on each printing color. And based on the above-mentioned information inputted into each by the polygon mirror which is contained in each scanner 3 thru/or 6, and which is not illustrated, the deflection scan of each light beam B, Y, M, and C outputted from the semiconductor laser which is contained in each scanner 3 thru/or 6, and which is not illustrated is carried out in the direction (direction shown by both arrow heads in drawing 2) vertical to the space of drawing 1.

[0032] At this time, the laminating of each scanner 3 thru/or 6 is carried out mutually, it is fixed to the main part frame BD by the scanner support 2 and 2' which were fixed on the base plate 1, and it is held.

[0033] On the other hand to the black cartridge 7 corresponding to each printing color, the yellow cartridge 8, the Magenta cartridge 9, and the cyanogen cartridge 10 Each is equipped with drum-like (cylindrical) the black photo conductor 15, the yellow photo conductor 16, the Magenta photo conductor 17, and the cyanogen photo conductor 18. While each light beams B, Y, M, and C by which the deflection scan was carried out from each above-mentioned scanner 3 thru/or 6 are irradiated by each photo conductor 15 thru/or 18 When each photo conductor 15 thru/or 18 rotate to the circumference of drawing 1 Nakamigi centering on a shaft vertical to the space of drawing 1, the image corresponding to the information on each printing color is recorded on each photo conductor 15 concerned thru/or 18. And it is stored in each cartridge 7 thru/or 10 by the portion on which each image was recorded, and the toner of each printing color charged in reversed polarity adheres to it in each photo conductor 15 thru/or 18 beforehand. at this time, as for each photo conductor 15 thru/or 18, each axis of rotation is held at the photo conductor support 24 -- each sensitization side -- the direction of a vertical -- abbreviation -- it is held so that it may exist in the same parallel flat surface. This photo conductor support 24 is formed with the material which has the above-mentioned scanner support 2 and the same coefficient of linear expansion as 2', and is being fixed to the main part frame BD through the base plate 1. In this case, as a material of the scanner support 2 and 2', either is used for photo conductor support 24 list among stainless steel or galvanized steel.

[0034] Furthermore, the edge which has each cartridge 7 the photo conductor 15 of 10 thru/or 18, and the edge of an opposite hand separate the cartridge which adjoins with the cartridge supporters 11, 12, 13, and 14 of a cylindrical shape, respectively, and a predetermined distance, and are supported. At this time, the cartridge supporter 11 is fixed to the black cartridge 7, the cartridge supporter 12 is fixed to the yellow cartridge 8, the cartridge supporter 13 is fixed to the Magenta cartridge 9, and the cartridge supporter 14 is being fixed to the cyanogen cartridge 10. Moreover, each cartridge supporter 11 thru/or 14 are prepared outside the scanning zone of each light beam B, Y, M, and C, as shown in drawing 2. The optical path for the photo conductor 15 with which each light beams B, Y, M, and C correspond directly thru/or 18 glaring by this will be secured.

[0035] And since it is supported by the photo conductor supporter 24 so that each cartridge 7 containing each photo conductor 15 thru/or 18 thru/or 10 can insert from the upper part of electrophotography equipment S as shown in drawing 1, at the time of maintenance, such as a supplement of each cartridge 7 thru/or the toner in 10, it can carry out by pulling out each cartridge 7 thru/or 10 above electrophotography equipment S. Furthermore, by making the black cartridge 7 with the highest (exchange frequency being the highest if it puts in another way) operating frequency of a toner into the topmost part, when the laminating of the yellow cartridge 8, the Magenta cartridge 9, and the cyanogen cartridge 10 is carried out and they are hereafter supported by order with high operating frequency, maintenance will become easy further.

[0036] Moreover, the transfer paper to which paper is fed from a sheet paper cassette 23 The transfer belt 19 top is transported downward from drawing 1 Nakagami, and it sets in the middle of the migration. By contacting the photo conductor 15 which the toner of each printing color is adhering and rotating into the portion on which the image was recorded thru/or 18 By performing the imprint of the image for every printing color, and performing the imprint concerned in four printing colors, it becomes the transfer paper color-printed eventually, and in a fixing assembly 20, it is fixed to the toner of each printing color, and it is outputted. In addition, the arrow head shows the path of a transfer paper to drawing 1. Here, it is equipped with the imprint belt 19 inside the front lid 25, and as a dotted line shows, the

whole transit route of the transfer paper which contains a photo conductor 15 thru/or 18 for the front lid 25 in the state of an open beam is exposed [it opens and closes to drawing 2 with closing motion of the front lid 25 centering on the closing motion shaft 27 by lengthening a handle 21, and] to it. At this time, transfer of the rotational motion force for the transfer paper transfer to the imprint belt 19 is based on linkage between the gearings with which the front lid 25 and the main part frame BD were equipped and which do not illustrate.

[0037] Furthermore, as shown in drawing 2 , each cartridge 7 thru/or 10 are equipped with the cartridge handle 26 in the upper part, respectively, and it can pull out now up easily in the cases, such as exchange maintenance of a toner.

[0038] While a transfer paper is sent with the imprint belt 19 according to this operation gestalt so that the photo conductor 15 thru/or each sensitization side of 18 by which the laminating was carried out into the main part frame BD may be touched one by one as explained above Since it has the imprint belt 19 concerned inside the front lid 25 and closing motion of the front lid 25 concerned is enabled to the main part frame BD with the imprint belt 19 Even when the paper jam of a transfer paper arises during the imprint of each printing color, the whole transit route which a transfer paper passes can be exposed to a user, and paper jam clearance processing can be performed simple.

[0039] Moreover, since each cartridge 7 thru/or 10 are arranged as directly glared, respectively in the photo conductor 15 with which each light beam B, Y, M, and C corresponds from each scanner 3 thru/or 6 thru/or 18, on a photo conductor 15 thru/or the optical path of the light beams B, Y, M, and C to 18, it is unnecessary and deflection equipments, such as a reflective mirror, can simplify the configuration of electrophotography equipment.

[0040] Furthermore, since the photo conductor supporter 24 supports a photo conductor 15 thru/or 18 again so that each sensitization side may be arranged on the same flat surface of the direction of a vertical and each cartridge 7 thru/or 10 can be taken in the direction of a vertical, the maintainability at the time of cartridge exchange etc. improves.

[0041] Moreover, since the cartridge supporter 11 thru/or 14 support each cartridge 7 thru/or 10 so that the optical path of light beams B, Y, M, and C may not be intercepted, a photo conductor 15 thru/or the optical path of each light beam to 18 are not intercepted.

[0042] Furthermore, since the scanner support 2, and 2' and the photo conductor supporter 24 are formed again with the material which has the same coefficient of linear expansion, even if electrophotography equipment is heated, the physical relationship to which a scanner 3 6 and a photo conductor 15 thru/or 18 correspond is not changed. Therefore, since the photo conductor 15 of light beams B, Y, M, and C thru/or the exposure location on 18 are not changed, a clear imprint image is obtained.

[0043] Moreover, since each cartridge 7 thru/or 10 are arranged in order of the operating frequency of each printing color by making the black cartridge 7 into the topmost part, the maintainability at the time of cartridge exchange etc. improves.

[0044] In addition, although the above-mentioned operation gestalt showed the case where this invention was applied to a color printer, this invention is applicable also not only to this but color facsimile or a color copy etc.

[0045]

[Effect of the Invention] While a transfer paper is sent by the imprint means according to invention according to claim 1 so that the sensitization side in the photo conductor of the development means corresponding to each printing color arranged so that it might stand in a line up and down in a main part frame may be touched one by one as explained above Since closing motion is made possible, the door equipped with the imprint means concerned inside rotating, even when the paper jam of a transfer paper arises during the imprint of each printing color, the transit route which a transfer paper passes can be exposed to a user, and paper jam clearance processing can be performed simple.

[0046] Therefore, the maintainability in electronic-raster-scanning equipment can be raised. According to invention according to claim 2, while the sensitization side of a photo conductor supports two or more development means so that supporter material may be arranged on the same flat surface of the direction of a vertical in addition to an effect of the invention according to claim 1 Since closing motion is made possible, rotating a closing motion shaft with a door parallel to the direction of a vertical as a center, even when the paper jam of a transfer paper arises during the imprint of each printing color, the transit route which a transfer paper passes can be exposed to a user, and paper jam clearance processing can be performed simple.

[0047] Since according to invention according to claim 3 it is arranged so that a development means may be directly irradiated by the photo conductor with which each light beam corresponds from an outgoing radiation means, respectively in addition to an effect of the invention according to claim 1 or 2, on the optical path of the light beam to a photo conductor, it is unnecessary and deflection means, such as a reflective mirror of a light beam, can simplify the configuration of electrophotography equipment.

[0048] Since according to invention according to claim 4 a photo conductor is supported so that in addition to an effect of the invention according to claim 3 each sensitization side may be arranged on the same flat surface of the direction of

a vertical and photo conductor supporter material can go a development means in the vertical direction in and out, the maintainability at the time of development means exchange etc. improves.

[0049] Moreover, since development means supporter material supports each development means so that the optical path of a light beam may not be intercepted, the optical path of the light beam to a photo conductor is not intercepted, and on the optical path of the light beam to a photo conductor, and deflection means, such as a reflective mirror of a light beam, can simplify the configuration of electrophotography equipment.

[0050] Since it is formed [according to invention according to claim 5] with the material with which outgoing radiation means supporter material and photo conductor supporter material have the same coefficient of linear expansion in addition to the effect of the invention according to claim 4, even if electrophotography equipment is heated, the physical relationship of an outgoing radiation means and a photo conductor is not changed.

[0051] Therefore, since the exposure location on the photo conductor of a light beam is not changed, a clear imprint image is obtained. Since according to invention according to claim 6 in addition to the effect of the invention given in any 1 term of claims 1-5 it is arranged so that the development means corresponding to the highest printing color of operating frequency in two or more development means may serve as the topmost part at the order of the operating frequency of each printing color, the maintainability at the time of development means exchange etc. improves.

[0052] Since the development means corresponding to the black which is the highest printing color of operating frequency is arranged [according to invention according to claim 7] at the topmost part in addition to the effect of the invention according to claim 6, the maintainability at the time of development means exchange etc. improves.

[Translation done.]

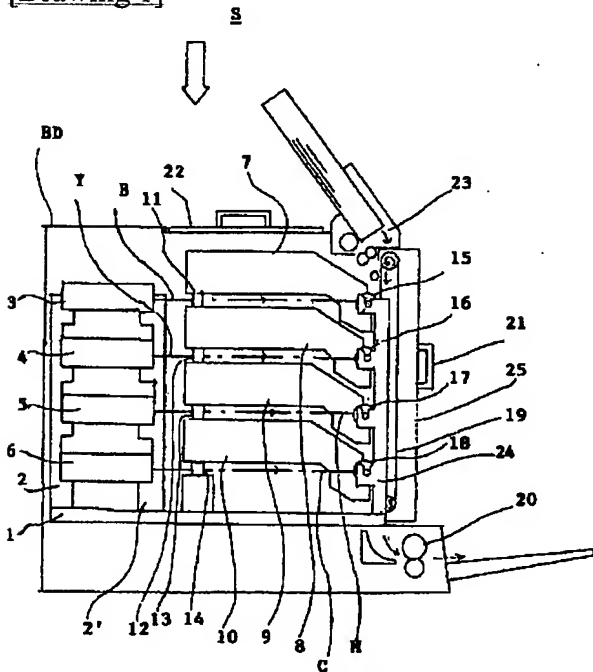
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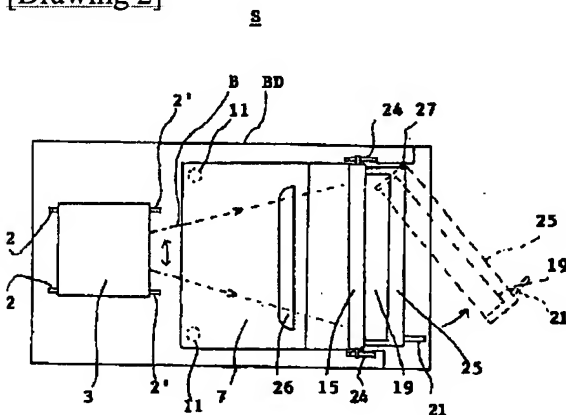
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]